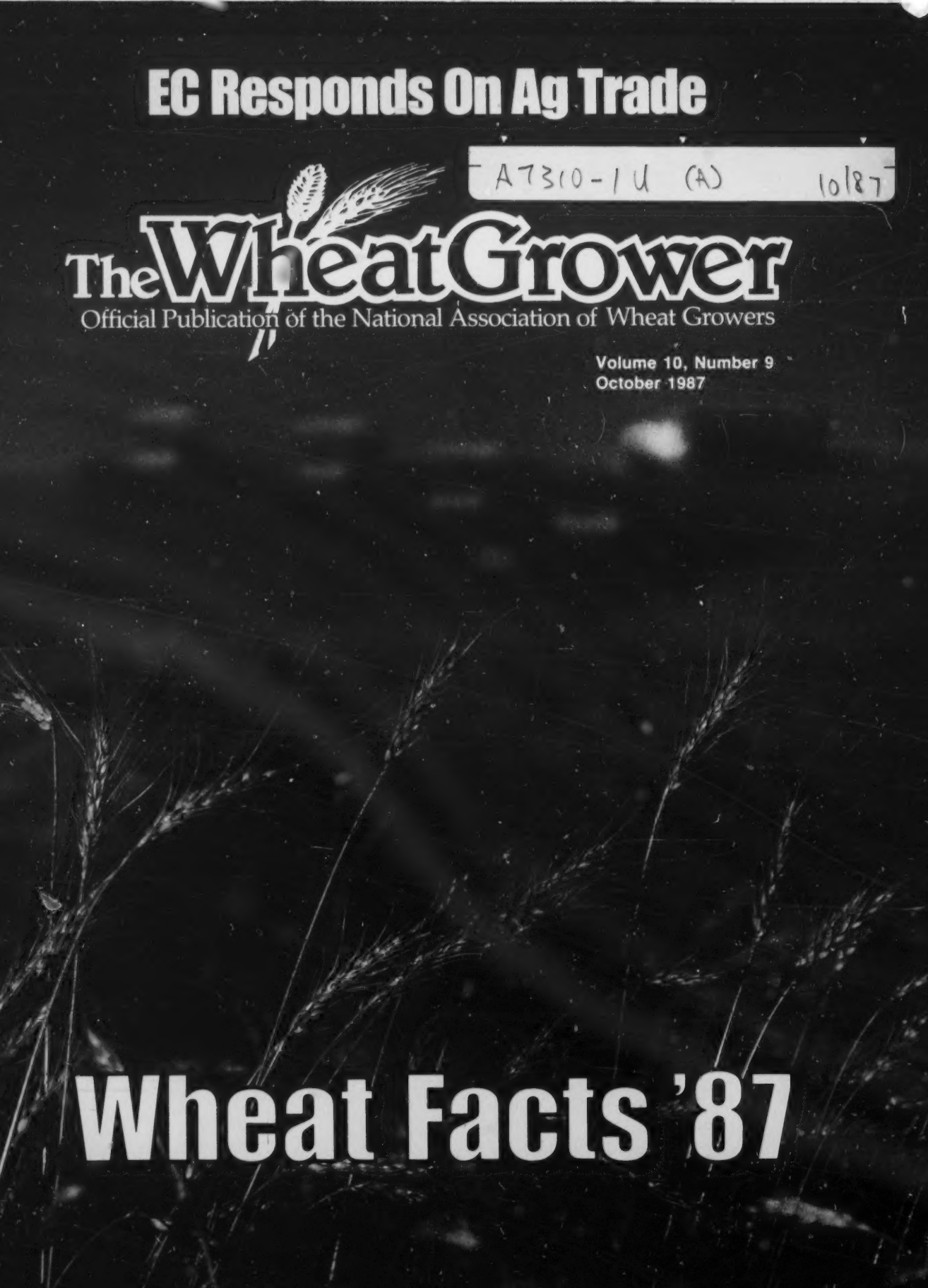
EC Responds On Ag Trade

A7310-1U (A) 10187

The Wheat Grower
Official Publication of the National Association of Wheat Growers

Volume 10, Number 9
October 1987



Wheat Facts '87

The Wheat Grower
Official Publication of the National Association of Wheat Growers
October 1987

DEPARTMENTS

2 **Committee Views**
Competitiveness & Production Controls

3 **Washington Update**

PAGE 4/Interview with Derwent Renshaw

INTERVIEW

4 **European Views On Agricultural Production & Trade**
EC Price Support Policies May Be Changing
An interview with Derwent Renshaw, the European Community's agricultural counselor in the United States.

FEATURE STORY

8 **EPA Pesticide Restrictions Aim To Protect Wildlife**
Growers Have New Responsibilities For Endangered Species
Recently-passed amendments and EPA regulations will require that wheat growers in 14 NAWG states become more responsible for protecting endangered species.

12 **Wheat Beers Gaining Popularity**
Western U.S. Is Leader In German-Style Brew
At one time in history, the grain ingredient in beer was wheat, not barley. Small U.S. breweries are beginning to rediscover the light taste that wheat brings to beer.

15 **Ciba-Geigy Helps TV Work For NAWG**
Company Plans Third Year Of Convention 'Wheat Reports'
NAWG's Annual Convention has been broadcast to the rooms of convention attendees for the past two years. In 1988 the Convention will be beamed to farm-state TV stations as well.

20 **Grain Standards Should Consider The Customer**
Future Standards Must Meet Needs Of Millers And Bakers
Current U.S. grading standards emphasize physical characteristics and have evolved for the benefit of grain handlers. These standards may need to be changed to stress milling and baking characteristics.

SPECIAL SECTION/Wheat Facts

WHEAT FACTS

The Wheat Grower's annual special section of information about the worldwide production and trade of wheat.

FOREIGN MARKETING FOCUS

24 **Korean Economic Progress Yields Increased Commercial Wheat Sales**
U.S. Wheat Gears Up For '88 Olympics

WHEAT & WEATHER OUTLOOK

26 **A Look At Weather Patterns & Market Forecasts By Merrill Lynch**

WHEAT FACTS 1987

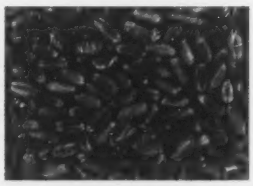
This special supplement is compiled by *The Wheat Grower.*

Sponsored By
CIBA–GEIGY

FIVE BASIC CLASSES OF WHEAT

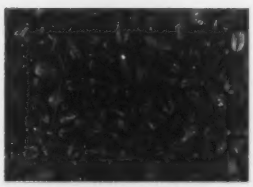
Wheat varieties grown in the United States are either "winter wheat" or "spring wheat," depending on the season each is planted. Winter wheat is sown in the fall and has some preliminary growth before cold weather arrives. The plants have a special gene that allows them to lie dormant through the winter. In the spring, they resume growth and grow rapidly until summertime harvest. Spring wheat, produced in northern states where winters are too severe for fall-sown wheat, is sown in the spring as soon as the ground is workable and grows continuously until harvest.

The many varieties of winter and spring wheat are grouped into five basic classes. The class each variety fits into is determined by the hardness, color and shape of its kernels, as well as by its planting time. Each class of wheat has its own similar family characteristics, especially as related to milling and to baking or other food use. The five basic classes are:

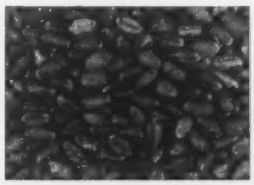


HARD RED WINTER: An important bread wheat. Accounts for a majority of the U.S. wheat crop. Produced in the Great Plains states, a large interior area extending from the Mississippi River west to the Rocky Mountains, and from the Dakotas and Montana down to Texas. Fall seeded. Wide range of protein content. Good milling and baking characteristics. No subclasses.

WHITE WHEAT: Used in the same ways as Soft Red Winter (for bakery products other than bread). Grown mainly in the Pacific Northwest; to a lesser extent in California, Michigan, Wisconsin and New York. Includes both winter and spring varieties. High yields. Relatively low protein. An important export wheat, particularly to the Far East. Subclasses include Hard White, Soft White, Western White and White Club.



SOFT RED WINTER: Grown in the eastern third of the United States. High yielding. Relatively low protein. Provides flour for cakes, pastries, quick breads, crackers and snack foods. No subclasses.



HARD RED SPRING: Another important bread wheat. Excellent protein content and milling and baking characteristics. Spring seeded. Grown in north central United States: North Dakota, South Dakota, Minnesota and Montana. Subclasses include Dark Northern Spring, Northern Spring and Red Spring.

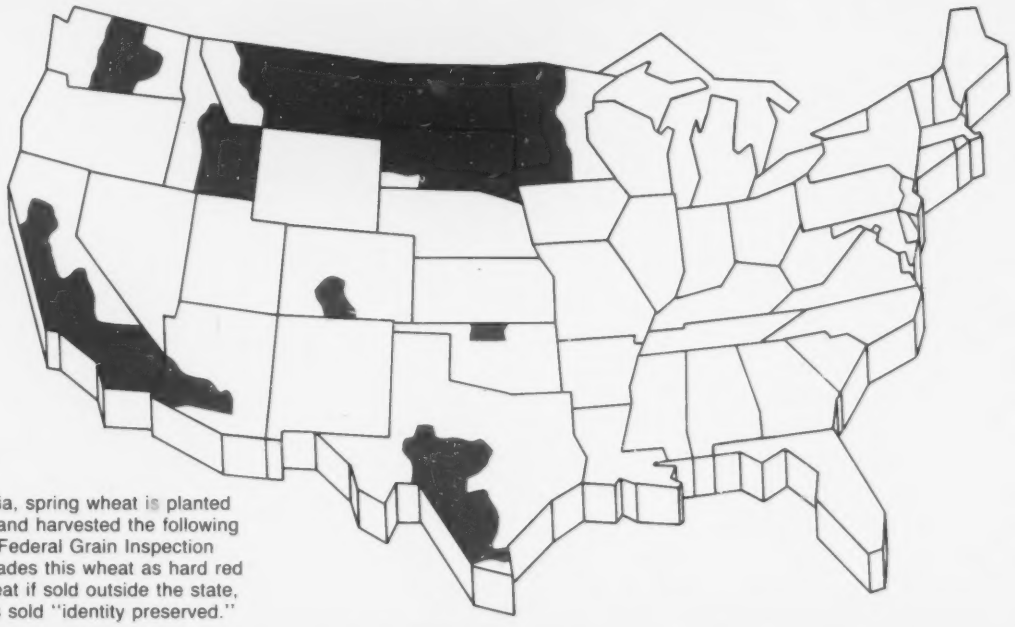
DURUM: The hardest of all U.S. wheat. Provides semolina for spaghetti, macaroni and other pasta products. Grown in the same northern area as Hard Red Spring, mainly in North Dakota. Subclasses are Hard Amber Durum, Amber Durum and Durum.

Other classes:

UNCLASSED WHEAT: Any variety of wheat which is not classifiable under other criteria provided in the wheat standards. There are no subclasses in this class. This class includes: 1) Red Durum wheat; 2) any wheat which is other than red or white in color.

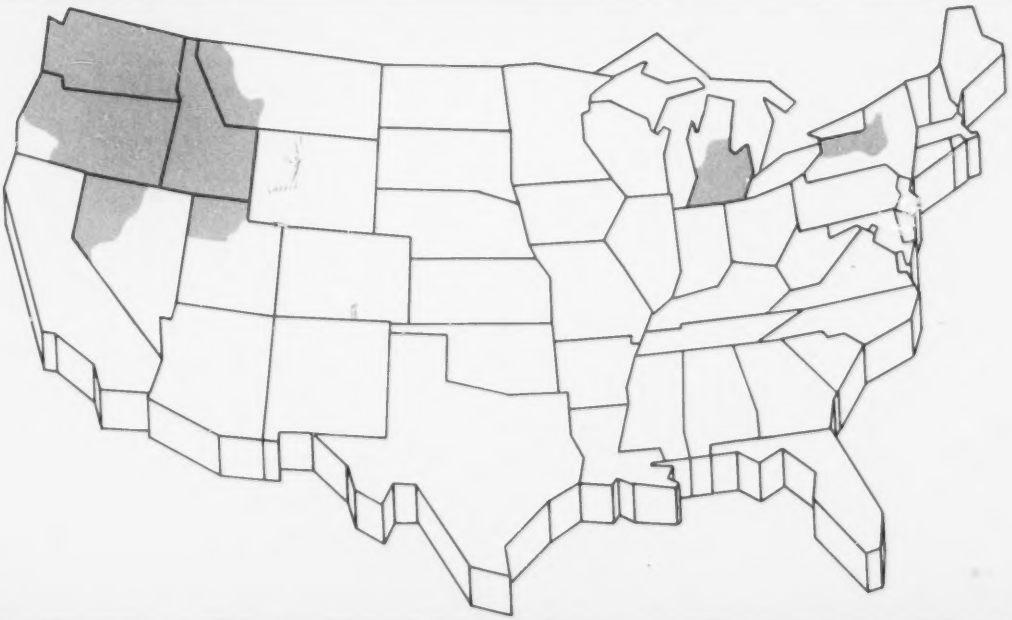
MIXED WHEAT: Any mixture of wheat consisting of less than 90 percent of one class and more than 10 percent of one other class, or a combination of classes which meets the definition of wheat.

U.S. WHEAT GROWING REGIONS
Hard Red Spring



In California, spring wheat is planted in the fall and harvested the following year. The Federal Grain Inspection Service grades this wheat as hard red spring wheat if sold outside the state, unless it is sold "identity preserved."

U.S. WHEAT GROWING REGIONS
White Wheat



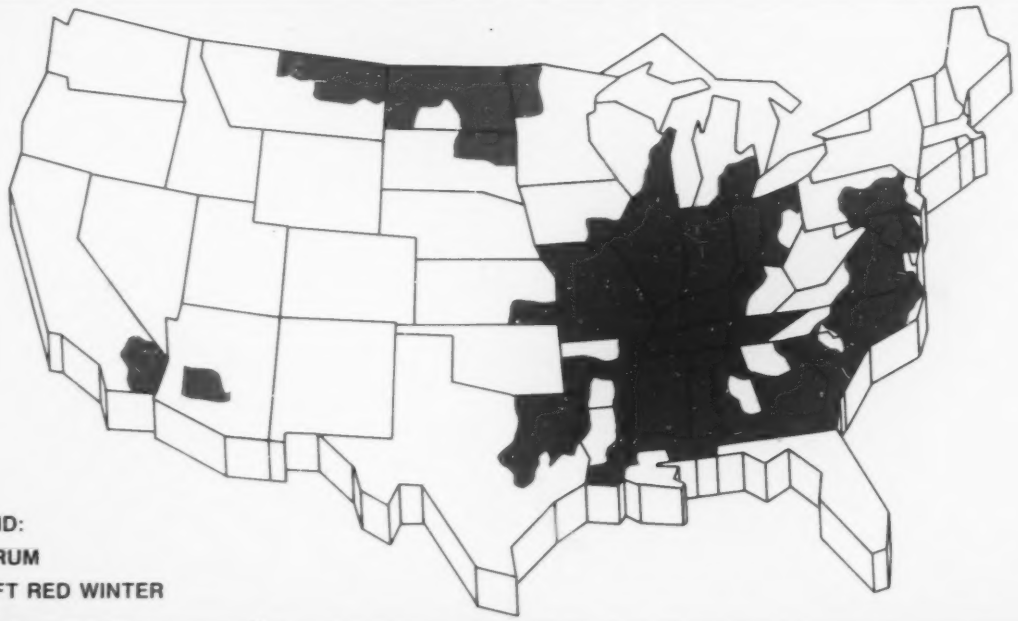
Sponsored by CIBA-GEIGY

U.S. WHEAT GROWING REGIONS

Hard Red Winter

U.S. WHEAT GROWING REGIONS

Durum and Soft Red Winter

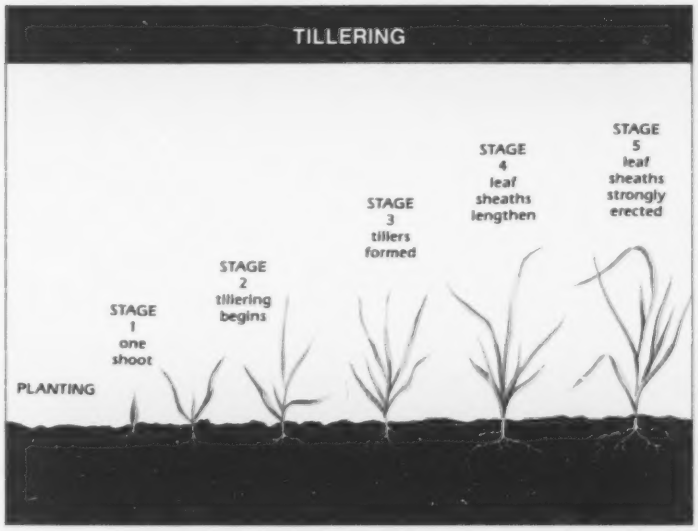


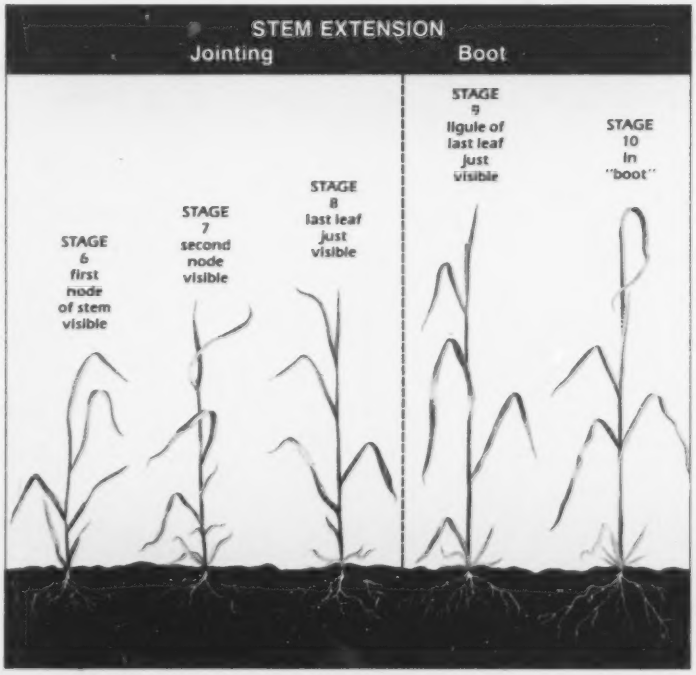
FEEKES' SCALE OF WHEAT DEVELOPMENT

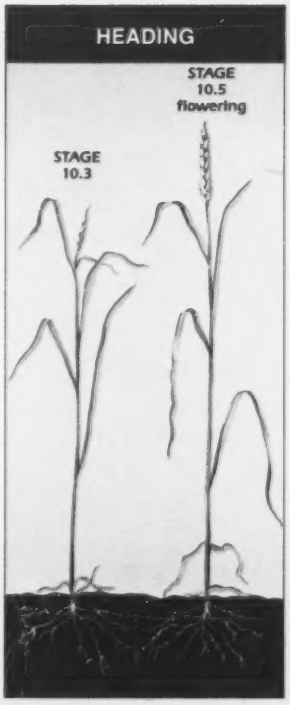
Knowing the various stages of growth and development of a wheat crop enables growers to exercise better management of inputs by allowing these inputs to be used at the proper growth stage and not according to a calendar date.

Agronomists have developed the "Feekes' Scale," an objective measure of the growth and development of wheat plants, to help growers identify the optimum time to apply inputs.

This measuring system ranges from 1.0 (to designate emergence of the first seedling leaf) to 11.4 (to designate mature plants with hard grain).




STEM EXTENSION
Jointing
Boot
STAGE 6 first node of stem visible
STAGE 7 second node visible
STAGE 8 last leaf just visible
STAGE 9 ligule of last leaf just visible
STAGE 10 in "boot"



Courtesy Mobay

GRADES AND GRADE REQUIREMENTS FOR ALL CLASSES OF WHEAT (EXCEPT MIXED)

	Minimum limits of—		Maximum limits of—						
	Test Weight per bushel							Wheat of other classes[4]	
	Hard Red Spring wheat or White Club wheat	All other classes and subclasses	Heat damaged kernels	Damaged kernels (total)[2]	Foreign material	Shrunken and broken kernels	Defects (total)[3]	Contrasting classes	Wheat of other classes[5]
	(pounds)[1]	(pounds)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)
U.S. No. 1	58.0	60.0	0.2	2.0	0.5	3.0	3.0	1.0	3.0
U.S. No. 2	57.0	58.0	0.2	4.0	1.0	5.0	5.0	2.0	5.0
U.S. No. 3	55.0	56.0	0.5	7.0	2.0	8.0	8.0	3.0	10.0
U.S. No. 4	53.0	54.0	1.0	10.0	3.0	12.0	12.0	10.0	10.0
U.S. No. 5	50.0	51.0	3.0	15.0	5.0	20.0	20.0	10.0	10.0

U.S. Sample Grade . . . U.S. Sample Grade shall be wheat which:

(a) does not meet the requirements for the grades U.S. No. 1, 2, 3, 4, or 5; or

(b) contains 8 or more stones, 2 or more pieces of glass, 3 or more crotalaria seeds (*Crotalaria spp.*), 2 or more castor beans (*Ricinus communis*), 4 or more particles of an unknown foreign substance(s) or a commonly recognized harmful or toxic substance(s), or 2 or more rodent pellets, bird droppings, or equivalent quantity of other animal filth per 1,000 grams of wheat; or

(c) has a musty, sour, or commercially objectionable foreign odor (except smut or garlic odor); or

(d) is heating or otherwise of distinctly low quality.

[1]These requirements also apply when Hard Red Spring wheat or White Club wheat predominate in a sample of Mixed wheat.
[2]Includes heat-damaged kernels.
[3]Defects (total) include damaged kernels (total), foreign material, and shrunken and broken kernels. The sum of these three factors may not exceed the limit for defects.
[4]Unclassed wheat of any grade may contain not more than 10 percent of wheat of other classes.
[5]Includes contrasting classes.

FGIS WHEAT PROTEIN MEASUREMENT CHART

The Federal Grain Inspection Service certifies the protein content of wheat on a constant 12 percent moisture basis. This procedure, rather than certification at "as is" moisture levels, adds accuracy to protein reporting and helps market U.S. wheat by making our system more consistent with the reporting procedures of our customers and competitors alike.

Use this formula to figure the protein of wheat on a 12 percent moisture basis:

$$\text{\% Protein @ 12\% Moisture Basis} = \frac{\text{\% Protein @ As Is Moisture} \times 88}{100 - \text{(As Is Moisture \%)}}$$

For example:

12% protein at 10% moisture

$$\text{\% Protein @ 12\% Moisture} = \frac{12 \times 88}{100 - 10} = 11.73\% \text{ protein}$$

If protein is _____% at _____% moisture, FGIS official protein is _____%.

12.0	9.0	11.6
11.5	10.0	11.2
12.0	12.0	12.0
11.0	14.0	11.3

WHEAT PRODUCTION IN NAWG STATES, 1985–1987

State	Area Harvested (1,000 a.)			Yield (bu.)			Production (1,000 bu.)		
	1985	1986	1987[1]	1985	1986	1987[1]	1985	1986	1987[1]
Arizona	112	96	94	87.5	90.5	90.8	9,804	8,688	8,537
Arkansas	570	780	825	32.0	41.0	43.0	18,240	31,980	35,475
California	830	675	537	83.0	76.3	81.6	68,860	51,525	43,815
Colorado	3,522	2,955	2,560	39.6	32.6	39.7	139,302	96,430	101,700
Idaho	1,350	1,310	1,140	53.4	62.4	67.2	72,030	81,750	76,600
Kansas	11,400	10,200	9,800	38.0	33.0	38.0	433,200	336,600	372,400
Minnesota	2,683	2,814	2,519	53.1	36.8	43.6	142,426	103,666	109,759
Montana	3,960	4,760	4,500	12.7	29.1	31.6	50,240	138,520	142,000
Nebraska	2,300	2,000	1,950	39.0	38.0	44.0	89,700	76,000	85,800
New Mexico	570	460	360	36.0	22.0	32.0	20,520	10,120	11,520
North Carolina	760	460	440	29.0	31.0	41.0	22,040	14,260	18,040
North Dakota	8,870	9,380	8,726	36.4	30.9	31.8	323,255	289,820	277,358
Oklahoma	5,500	5,200	4,800	30.0	29.0	27.0	165,000	150,800	129,600
Oregon	1,065	1,025	810	52.6	57.0	65.1	56,040	58,405	52,740
South Dakota	3,755	3,840	3,505	29.6	28.3	31.8	111,215	108,660	111,350
Texas	5,850	4,800	3,800	32.0	25.0	28.0	187,200	120,000	106,400
Washington	2,690	2,410	2,015	47.7	48.5	56.2	128,250	116,850	113,335
Wyoming	248	277	276	22.3	30.5	32.8	5,528	8,445	9,040
Total	55,275	53,442	48,657	—	—	—	2,042,850	1,802,519	1,805,469

[1]Indicated as of August 1, 1987.

U.S. WHEAT: SUPPLY AND USE, 1970/71–1987/88

Crop Year	Planted Acres (1,000)	Harvested Acres (1,000)	Yield (bu./a)	Production	Supply[1]	Domestic Food	Feed, Seed, Other	Exports	Total Use	Ending Stocks	CCC Inventory	Farmer-Owned Reserve
				MILLION BUSHELS								
1970	48,739	43,564	31.0	1,352	2,336	517	255	741	1,513	823	370	8[2]
1971	53,822	47,635	33.9	1,619	2,442	524	325	610	1,459	984	367	13[2]
1972	54,913	47,303	32.7	1,546	2,530	532	267	1,135	1,934	597	144	11[2]
1973	59,254	54,148	31.6	1,711	2,311	545	209	1,217	1,971	340	19	—
1974	71,044	65,368	27.3	1,782	2,125	545	127	1,018	1,690	435	1	—
1975	74,900	69,499	30.6	2,127	2,564	589	137	1,173	1,898	666	0	—
1976	80,395	70,927	30.3	2,149	2,817	588	166	950	1,704	1,113	0	—
1977	75,410	66,686	30.7	2,046	3,161	587	272	1,124	1,983	1,178	48	342
1978	65,989	56,495	31.4	1,776	2,955	592	245	1,194	2,031	924	51	403
1979	71,424	62,454	34.2	2,134	3,060	595	188	1,375	2,158	902	188	260
1980	80,788	71,125	33.5	2,381	3,285	611	172	1,514	2,297	989	200	360
1981	88,251	80,642	34.5	2,785	3,777	602	245	1,771	2,618	1,159	190	560
1982	86,232	77,937	35.5	2,765	3,932	616	292	1,509	2,417	1,515	192	1,061
1983	76,419	61,390	39.4	2,420	3,939	635	476	1,429	2,540	1,399	188	611
1984	79,200	66,900	38.8	2,595	4,003	651	502	1,424	2,578	1,425	378	654
1985	75,575	64,734	38.1	2,425	3,866	683	363	915	1,961	1,905	602	433
1986[3]	72,033	60,688	34.4	2,087	4,013	724	470	1,004	2,198	1,815	830	463
1987[4]	65,163	55,386	38.4	2,125	3,955	750	255	1,225	2,230	1,725	n/a	n/a

[1]Includes beginning stocks, production and imports.
[2]The farmer-owned reserve program began in 1977. Prior to that, the reseal program was in effect.
[3]Preliminary.
[4]Projected.

U.S. WHEAT BY CLASSES: SUPPLY AND DISAPPEARANCE 1986/87–1987/88

(million bushels)

Year beginning June 1	Hard Winter	Hard Spring	Soft Red	White	Durum	Total
1986/87 Beginning stocks	1,009	498	79	198	121	1,905
Production	1,018	451	290	232	95	2,087
Supply, total[1]	2,027	956	369	437	223	4,013
Domestic use	628	266	177	77	46	1,194
Exports	432	200	115	175	82	1,004
Use, total	1,060	466	292	252	128	2,198
Ending stocks, total	967	490	77	185	95	1,815
1987/88 Beginning stocks	967	490	77	185	95	1,815
Production	1,026	446	345	211	96	2,125
Supply, total[1]	1,993	943	422	399	196	3,955
Domestic use	460	217	198	70	60	1,005
Exports	625	230	160	150	60	1,225
Use, total	1,085	447	358	220	120	2,230
Ending stocks, total	908	496	64	179	76	1,725

[1]Includes imports.

ALL WHEAT: PRICES RECEIVED BY FARMERS, NAWG STATES, 1984–87

(dollars per bushel)

				1987					
STATE	1984	1985	1986	Jan.	Feb.	March	April	May	June
Arizona	4.08	3.52	3.29	2.82	3.38	n/a	n/a	3.06	2.90
Arkansas	3.29	3.04	2.50	2.56	2.47	2.62	2.48	2.49	2.41
California	3.71	3.43	2.83	3.12	3.01	2.79	2.63	3.01	2.80
Colorado	3.19	2.77	2.26	2.28	2.38	2.42	2.44	2.53	2.39
Idaho	3.30	3.18	2.38	2.52	2.56	2.51	2.53	2.57	2.45
Kansas	3.32	2.86	2.20	2.35	2.40	2.45	2.44	2.55	2.30
Minnesota	3.41	3.00	2.49	2.56	2.60	2.59	2.55	2.41	2.35
Montana	3.52	3.47	2.53	2.65	2.54	2.54	2.56	2.54	2.57
Nebraska	3.28	2.79	2.15	2.21	2.33	2.41	2.38	2.41	2.31
New Mexico	3.36	2.90	2.25	n/a	n/a	n/a	n/a	n/a	n/a
North Carolina	3.35	2.90	2.50	n/a	n/a	n/a	n/a	n/a	n/a
North Dakota	3.53	3.26	2.51	2.73	2.76	2.80	2.85	2.85	2.74
Oklahoma	3.36	2.91	2.30	2.35	2.43	2.46	2.48	2.54	2.30
Oregon	3.47	3.38	2.60	2.71	2.78	2.70	2.82	2.81	2.91
South Dakota	3.46	3.25	2.38	2.47	2.40	2.42	2.57	2.61	2.51
Texas	3.39	2.97	2.30	2.23	2.29	2.35	2.49	2.58	2.35
Washington	3.45	3.41	2.55	2.62	2.74	2.83	2.81	2.78	2.68
Wyoming	3.17	3.02	2.22	n/a	n/a	n/a	n/a	n/a	n/a

ALL WHEAT: MONTHLY AVERAGE PRICES RECEIVED BY FARMERS 1977/78–1987/88

(dollars per bushel)

Crop Year	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	Average Wt'd.	Average Simple
1977–78	2.03	2.04	2.13	2.16	2.30	2.46	2.47	2.53	2.59	2.67	2.82	2.82	2.33	2.42
1978–79	2.81	2.81	2.88	2.92	2.99	3.04	3.01	2.99	2.99	2.97	3.01	3.20	2.97	2.97
1979–80	3.72	3.89	3.74	3.87	3.98	3.94	3.81	3.74	3.78	3.64	3.58	3.69	3.78	3.78
1980–81	3.69	3.81	3.94	3.99	4.19	4.32	4.22	4.21	4.17	4.09	4.07	3.95	3.91	4.06
1981–82	3.70	3.62	3.62	3.65	3.77	3.85	3.80	3.78	3.70	3.67	3.68	3.64	3.65	3.71
1982–83	3.39	3.26	3.34	3.38	3.43	3.48	3.51	3.57	3.57	3.66	3.75	3.75	3.55	3.51
1983–84	3.50	3.34	3.61	3.65	3.61	3.54	3.48	3.50	3.40	3.49	3.63	3.66	3.54	3.53
1984–85	3.45	3.29	3.42	3.43	3.43	3.46	3.38	3.38	3.38	3.38	3.43	3.28	3.38	3.39
1985–86	3.09	2.93	2.89	3.00	3.09	3.23	3.25	3.19	3.15	3.28	3.36	3.02	3.16	3.12
1986–87	2.48	2.25	2.26	2.28	2.30	2.43	2.49	2.53	2.58	2.58	2.62	2.66	2.42	2.46
1987–88	2.45	2.30[1]												

[1]Preliminary

WHEAT PROGRAM SUMMARY 1981–1988

Crop Year	Support/ Target Price ($/bushel)	Loan Rate ($/bushel)	Average Price to Farmers ($/bushel)	Number of Farms Participating	National Acreage Allotment/ Base (million a.)	Acreage Diversion Set Aside on Farms Participating (million a.)	Payments Diversion &SG&H[1] (million $)
1981	3.81	3.20/3.50	3.65	782,608	84.50[2]	none	none
1982	4.05	3.55/4.00	3.55	222,912	90.66[2]	5.80	none
1983	4.30	3.65	3.53	498,013	90.19	30.02	308.9
1984	4.38	3.30	3.37	317,565	93.96	18.45	506.1
1985	4.38	3.30	3.08	472,886	94.04	18.82	653.9
1986	4.38	2.40	2.35	566,389	91.72	15.6	217.2
1987	4.38	2.28	–	518,929	89.59	–	–
1988	4.29	2.17	–	–	–	–	–

[1]Special Grazing and Hay program.
[2]National program acreage.

Sponsored by CIBA-GEIGY

THE KERNEL OF WHEAT . . .

The wheat kernel, sometimes called the wheat berry, is the seed from which the wheat plant grows. Each tiny seed contains three distinct parts that are separated during the milling process to produce flour. The kernel of wheat is a storehouse of nutrients essential to the human diet.

Endosperm

. . . about 83 percent of the kernel weight. It is the source of white flour. The endosperm contains the greatest share of the protein in the whole kernel, carbohydrates, iron as well as many B-complex vitamins, such as riboflavin, niacin, and thiamine.

Bran

. . . about 14½ percent of the kernel weight. Bran is included in whole wheat flour and is also available separately. Of the nutrients in whole wheat, the bran contains a small amount of protein, larger quantities of the B-complex vitamins listed above, trace minerals, and indigestible cellulose material also called dietary flour.

NUTRIENT COMPARISION OF SELECTED WHEAT FOODS

*100 Grams Edible Portion

Product	Calories	Protein grams	Fat grams	Carbohydrate grams
White Bread	267	8.28	3.92	48.82
Whole Wheat Bread	245	9.62	4.36	45.41
Cookie, Chocolate Chip	463	5.00	26.81	64.08
Doughnut	419	5.10	23.07	48.97
English Muffin	237	7.91	1.94	45.94
Crackers, Cheese	538	9.13	32.68	51.95
Pasta, dry	(368)	12.80	1.60	75.10

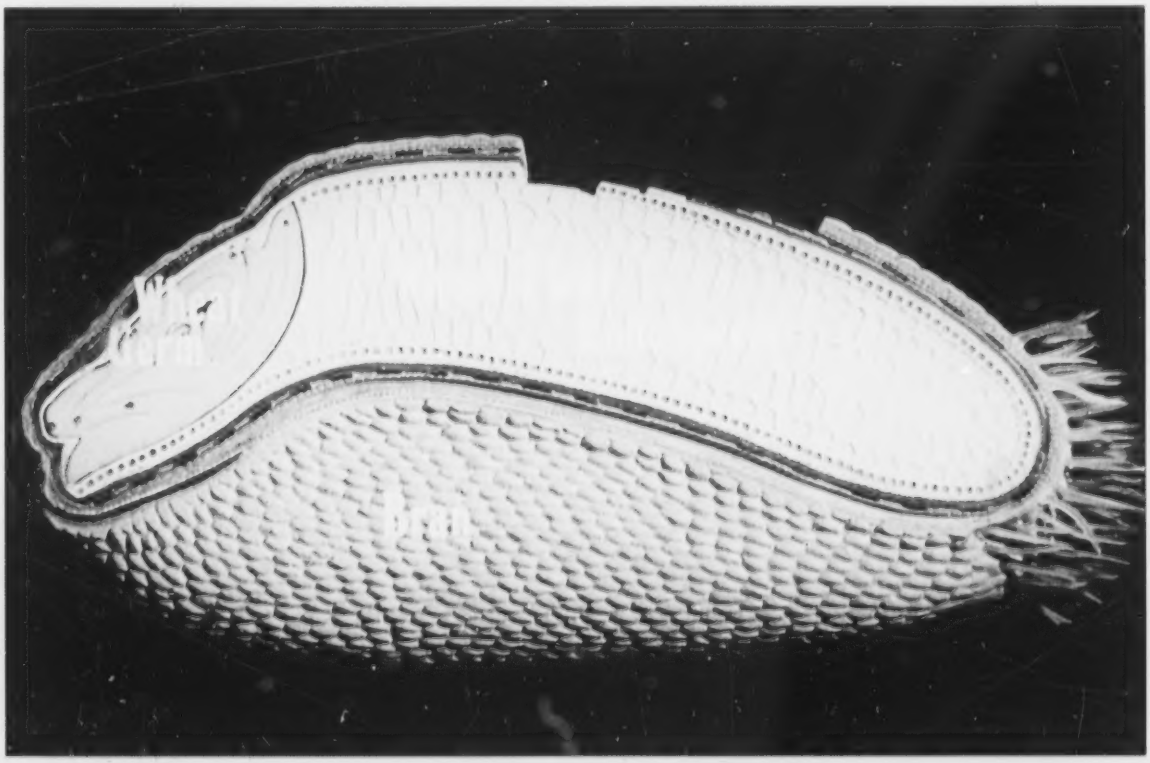
*100 grams equal 3.5 ounces

Parentheses ( ) denote calculated values U.S.D.A. Human Nutrition Services

Germ

. . . about 2½ percent of the kernel weight. The germ is the embryo or sprouting section of the seed, usually separated because of the fat that limits the keeping quality of flour. Of the nutrients in whole wheat, the germ contains minimal quantities of protein, but a greater share of B-complex vitamins and trace minerals. Wheat germ can be purchased separately and is included in whole wheat flour.

Courtesy Wheat Foods Council



WHEAT NUTRIENTS

Wheat foods are an essential part of a balanced diet because they provide good nutritional value for their caloric cost. Following are the basic nutritional components of wheat foods:

CARBOHYDRATE

Complex Carbohydrate—Wheat flour is a good source of complex carbohydrate, the most efficient source of energy available to the human body. Unlike simple carbohydrates, such as sugars, which are quickly absorbed into the blood stream, complex carbohydrate provides a steady source of fuel because it is released slowly.

Fiber—Fiber is the undigestible carbohydrate in food which acts like a broom to sweep out the digestive tract. Adequate fiber intake has been related to a lower incidence of cancer of the colon and some types of heart disease and to better control diabetes. One slice of whole wheat bread contains 1.5 grams of dietary fiber; one slice of white bread contains 0.5 grams.

PROTEIN

Wheat foods are moderate sources of incomplete protein. This means that while wheat and other cereal grains may contain all eight of the amino acids necessary for good health, not all eight are found at adequate levels. However, combining wheat or other cereal grains with animal proteins or legumes makes the grain protein complete. Within the cereal group, wheat contains more protein than rice or corn.

FAT

Fats account for 2 to 23 percent of wheat foods, although wheat alone contains very little fat. Most often, the fat content in wheat foods results from fat added in production, such as the oil or shortening found in many baked or fried wheat foods. Bread and pasta products are low-fat foods because the major ingredient, by weight, is wheat flour.

OTHER VITAMINS AND MINERALS

Thiamine—One of the essential B-vitamins needed daily for good appetite, digestion and healthy nerves. Thiamine helps the body make better use of fat and carbohydrate. Wheat foods are a good source of thiamine.

Niacin—A B-vitamin essential for the efficient use of protein by the body. Wheat foods are a good source of niacin.

Iron—Vital to nutrition. Combines with protein to form hemoglobin, a compound in red blood cells that carries oxygen from the lungs to each cell in the body while it carries away carbon dioxide. Wheat foods are a reliable source of iron for normal dietary needs.

Zinc—Important for skin healing and growth properties. Wheat foods are a good source of zinc.

Riboflavin—Essential for growth and good vision. Helps the body make use of carbohydrate, fat and protein. Wheat foods are a fair source of riboflavin.

Trace Minerals—Wheat foods are a good source of selenium and magnesium, nutrients essential to good health.

Courtesy Wheat Foods Council

WHEAT FLOURS

ALL-PURPOSE FLOUR

All-purpose flour is the finely ground endosperm of the wheat kernel separated from the bran and germ during the milling process. All-purpose flour is made from hard wheats or a combination of soft and hard wheat from which the home baker can make a complete range of satisfactory baked products such as yeast breads, cakes, cookies, pastries and noodles.

Enriched All-Purpose Flour has iron and B-vitamins added in amounts equal to or exceeding that of whole wheat flour.

Bleached Enriched All-Purpose Flour is treated with chlorine to mature the flour, condition the gluten and improve the baking quality. The chlorine evaporates and does not destroy the nutrients but does reduce the risk of spoilage or contamination.

Unbleached Enriched All-Purpose Flour is bleached by oxygen in the air during an aging process and is off-white in color. Nutritionally, bleached and unbleached flour are the same.

BREAD FLOUR

Bread flour, from the endosperm of the wheat kernel, is milled primarily for commercial bakers but is also available at retail outlets. Although similar to all-purpose flour, it has a greater gluten strength and generally is used for yeast breads.

SELF-RISING FLOUR

Self-rising flour is an all-purpose flour with salt and leavening added. One cup of self-rising flour contains 1-1/2 teaspoons baking powder and 1/2 teaspoon salt. Self-rising flour can be substituted for all-purpose flour in a recipe by reducing salt and baking powder according to those proportions.

WHOLE WHEAT FLOUR

Whole wheat flour is a coarse-textured flour ground from the entire wheat kernel and thus contains the bran, germ and endosperm. The presence of bran reduces gluten development. Baked products made from whole wheat flour tend to be heavier and denser than those made from white flour.

OTHER FLOURS

Cake Flour—Milled from soft wheat. Especially suitable for cakes, cookies, crackers and pastries. Low in protein and gluten.

Pastry Flour—Milled from a soft, low gluten wheat. Comparable in protein but lower in starch than cake flour.

Gluten Flour—Used by bakers in combination with flours having a low protein content because it improves the baking quality and produces gluten bread of high protein content.

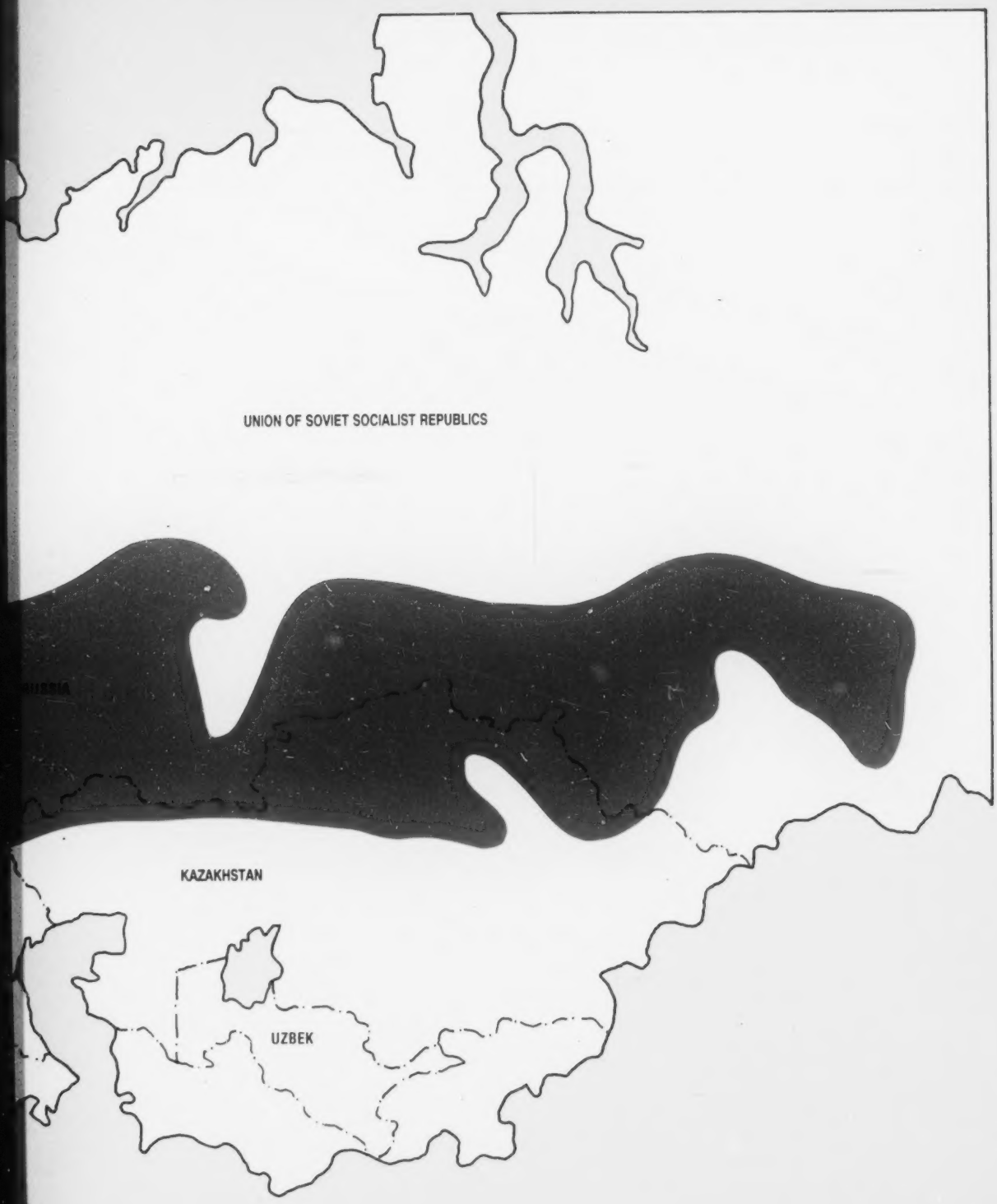
Semolina—Coarsely ground endosperm of durum wheat. High in protein. Used in high quality pasta products.

Durum Flour—By-product of semolina production. Used to make commercial U.S. noodles.

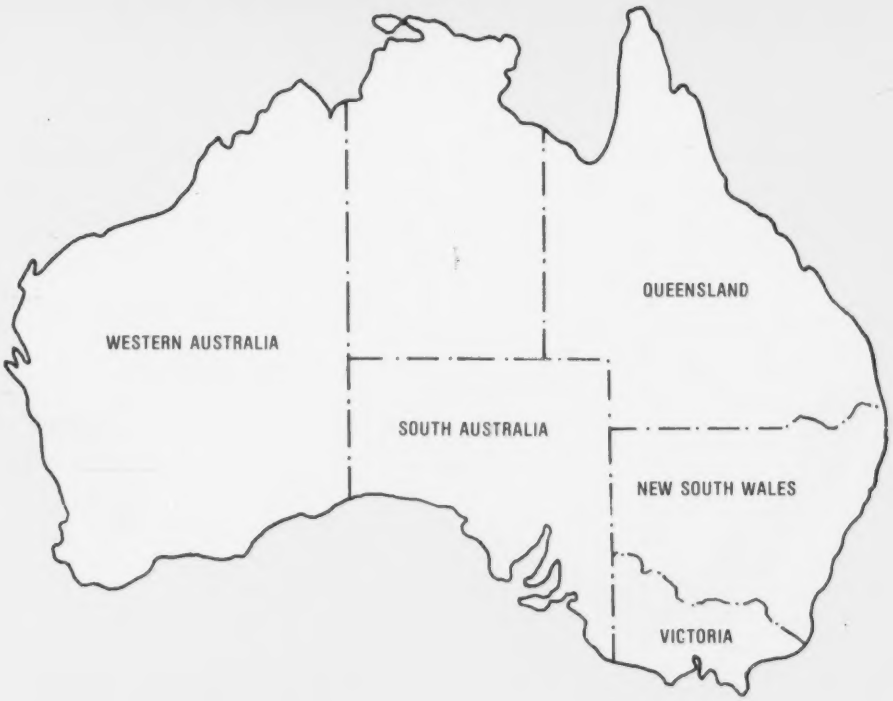
Farina—Coarsely ground endosperm of hard wheats. Prime ingredient in many U.S. breakfast cereals. Also used in the production of inexpensive pasta.

European and Asian Wheat Growing Regions, By Class

Sponsored by CIBA-GEIGY


UNION OF SOVIET SOCIALIST REPUBLICS
KAZAKHSTAN
UZBEK

Australian Winter Wheat Growing Regions



Chinese Winter Wheat Growing Regions

1 SHANDON
2 HEBEI
3 SHANXI
4 HENAN
5 SHAANXI
6 HUBEI
7 ANHUI
8 JIANGSU
9 ZHEJIANG
10 SICHUAN
11 BEIJING
12 TIAJIN

Sponsored by CIBA-GEIGY

U.S. WHEAT EXPORTS BY DESTINATION, 1983/84–1986/87

Ranked in Descending Order for Marketing Year 1986/87 Compared with the Four Previous Marketing Years (1,000 metric tons)

Country	1986/87 Quantity	1986/87 Rank	1985/86 Quantity	1985/86 Rank	1984/85 Quantity	1984/85 Rank	1983/84 Quantity	1983/84 Rank
Japan	3,317	1	3,236	1	3,306	2	3,435	2
Egypt	2,556	2	1,491	3	1,634	7	1,346	8
Korea	1,777	3	1,955	2	1,976	5	2,051	5
Algeria	1,729	4	1,247	4	468	22	469	22
Morocco	1,428	5	1,099	5	1,684	6	1,694	6
Venezuela	891	6	612	12	783	11	944	12
Taiwan	816	7	657	11	655	14	561	20
Nigeria	781	8	957	6	1,632	8	1,631	7
Iraq	727	9	662	10	798	10	1,257	9
Philippines	713	10	685	9	727	12	709	16
Brazil	647	11	722	8	3,142	3	2,247	4
Tunisia	620	12	62	46	631	16	616	17
Yugoslavia	576	13	—	—	—	—	—	—
Poland	543	14	81	41	65	45	72	47
Israel	538	15	470	16	575	19	410	24
Italy	521	16	365	21	311	25	550	21
Indonesia	441	17	259	23	593	17	984	11
Bangladesh	438	18	228	25	851	9	362	25
Sri Lanka	397	19	190	26	230	27	261	30
Ecuador	332	20	392	19	339	24	347	26
Colombia	276	21	498	15	633	15	589	18
Sudan	263	22	341	22	255	26	249	31
Turkey	224	23	459	18	580	18	415	23
Peru	222	24	153	28	483	21	575	19
Netherlands	197	25	372	20	423	23	712	15
Yemen (Sana)	180	26	30	52	105	37	261	29
Bolivia	172	27	114	35	35	54	212	32
Republic of South Africa	168	28	27	56	6	72	—	—
Dominican Republic	166	29	232	24	169	29	205	33
Chile	164	30	463	17	664	13	815	13
Zaire	154	31	110	37	106	36	67	50
Jamaica	152	32	146	31	92	40	69	48
Jordan	151	33	184	27	203	28	279	28
El Salvador	141	34	126	33	140	30	114	36
Portugal	128	35	505	14	563	20	785	14
Trinidad	116	36	110	36	111	33	115	35
Belgium	113	37	69	45	54	46	67	49
Guatemala	107	38	151	30	114	32	106	40
Honduras	107	39	78	42	86	42	78	45
Hong Kong	107	40	106	38	110	34	106	39
Costa Rica	105	41	136	32	121	31	103	41
Haiti	97	42	119	34	107	35	109	38
Panama	93	43	84	39	65	44	72	46
Mexico	87	44	—	—	21	59	—	—
Thailand	84	45	77	43	99	39	113	37

WHEAT INSPECTED FOR EXPORT BY CLASS, REGION AND PORT AREA

June 1986–May 1987 (1,000 bushels)

Port Area	Hard Red Spring	Hard Red Winter	Soft Red Winter	White	Durum	Mixed	Total
St. Lawrence Seaway	1,278	0	4,741	1,089	3,731	0	10,839
Lakes (Overseas)							
Chicago Area	0	1,367	0	0	0	0	1,367
Duluth-Superior Area	28,046	0	0	108	34,163	0	62,317
Toledo Area	0	0	4,830	684	0	0	5,514
Subtotal	28,046	1,367	4,830	792	34,163	0	69,198
Atlantic							
North	0	0	0	829	0	0	829
South	0	0	14,676	0	0	0	14,676
Subtotal	0	0	14,676	829	0	0	15,505
Gulf							
Mississippi River	48,056	13,646	75,256	0	7,015	3,717	147,690
East Gulf	0	346	2,667	0	191	0	3,204
N. Texas Gulf	21,549	276,525	3,355	0	27,891	386	329,706
S. Texas Gulf	0	12,187	0	0	0	0	12,187
Subtotal	65,605	302,704	81,278	0	35,097	4,103	492,787
Pacific							
Columbia River	85,251	74,526	53	164,692	2,931	0	327,453
Puget Sound	3,522	1,578	0	5,567	0	0	10,667
California	0	1,808	0	0	3,107	0	4,915
Subtotal	88,773	77,912	53	170,259	6,038	0	343,035
Interior	0	1,582	0	442	6	0	2,030
Totals							
June 86–May 87	187,702	383,365	105,578	173,411	79,035	4,103	933,394
June 85–May 86	154,710	349,825	141,260	146,940	51,227	3,863	847,825

Wheat shipped for storage in Canada is reported at the time of shipment from St. Lawrence Seaway ports.

WORLD WHEAT PRODUCTION, CONSUMPTION, MAJOR IMPORTERS[1]

1985/86–1987/88 (million metric tons)

Country	1985/86 Prod.	1985/86 Cons.	1985/86 Imports	1986/87 Prod.	1986/87 Cons.	1986/87 Imports	1987/88[2] Prod.	1987/88[2] Cons.	1987/88[2] Imports
USSR	78.10	91.60	15.70	87.00	92.00	17.00	75.50	93.50	21.00
China	85.81	92.41	6.60	88.50	95.00	7.50	89.00	98.00	9.00
Egypt	1.87	8.47	6.30	1.90	8.70	6.50	2.28	8.63	6.70
Japan	.87	6.26	5.53	.88	6.26	5.50	.89	6.10	5.50
Eastern Europe	36.97	37.97	3.47	39.75	40.02	3.70	39.44	40.46	3.70
Algeria	1.66	4.46	2.80	1.45	4.75	3.50	1.50	5.00	3.50
South Korea	.01	3.15	3.03	.01	3.46	3.80	.01	3.36	3.30
Brazil	4.30	6.80	2.50	5.30	8.00	2.50	4.00	7.60	3.00
Iraq	1.41	3.50	1.70	1.10	3.60	2.60	.80	3.70	2.80
Iran	5.30	8.20	2.20	5.80	8.40	2.50	6.20	8.60	2.50
Morocco	2.05	4.25	2.02	3.32	4.65	1.70	2.27	4.75	2.20
Bangladesh	1.04	2.13	1.16	1.30	2.78	1.50	1.40	2.90	1.70
Indonesia	0	1.36	1.38	0	1.57	1.60	0	1.60	1.60
Cuba	0	1.30	1.30	0	1.35	1.35	0	1.40	1.40
Peru	.09	.92	.91	.12	1.16	1.10	.13	1.28	1.25
Venezuela	0	1.00	1.00	0	1.05	1.05	0	1.51	1.05
Total World	498.76	486.19	—	522.50	503.00	—	508.90	508.70	—

[1]Trade on July–June years; production and consumption on local crop year. [2]Projected.

Sponsored by CIBA-GEIGY

WHEAT PURCHASES BY SELECTED COUNTRIES UNDER SPECIFIED GOVERNMENT EXPORT PROGRAMS

(1,000 tons)

(includes wheat flour grain equivalents in some cases)

Country	PL 480/Title II		GSM-102		EEP	
	FY 85	FY 86	FY 85	FY 86	FY 85	FY 86
Algeria				411		2,483
Bangladesh[1] [2]	346	172	307			
Benin						45
Bolivia	12	27				
Brazil			2,876	450		
Canary Islands						100
Chad	2					
Chile			264			
Colombia			557			
Dominican Republic	2					
Egypt	13	7	98	1,541	740	3,261
El Salvador		2				
Ecuador[1]			290	305		
Ethiopia	72					
Guatemala	6	.8	103	49		
Haiti[2]	.2	49	19	38		
Honduras	2	2				
India	49					
Indonesia	11					
Iraq			590	703		207
Jamaica	.9	.6	8	35		
Jordan[1]	8	3		302		150
Korea			735	1,221		
Lebanon	3	5				
Lesotho	18	4				
Mali	5					
Mauritania	28	.4				
Mexico	3					
Morocco[1]	33	25	485	883		1,500
Pakistan	200	283	88	220		
Peru	20	20	238			
Philippines	6	5	296			
Poland	50					288
Portugal			570	395		
Rwanda	1	1				
Senegal						100
Somalia	4					
Sri Lanka	16	18				125
Sudan	6					
Syria						700
Tunesia	4			68		1,100
Turkey			200	508		1,007
Yemen[1]				55		307
Yugoslavia						400
Zaire						210

[1]Also participated in GSM-103 in FY 86

[2]Also participated in Section 416 in FY 86

P.L. 480 TITLE I/III WHEAT/WHEAT FLOUR ALLOCATIONS, FY 1987

Countries with $790 or Less Per Capita GNP	TOTAL[1] ($Millions)	WHEAT/ FLOUR[2]
Bangladesh	$ 52	268
Bolivia	20	185
Egypt	185	1,488
El Salvador	42	100
Guyana	5	45
Haiti	18	139
Honduras	12	75
Indonesia	30	268
Kenya	8	71
Madagascar	8	40
Morocco	50	213
Sierra Leone	4	16
Sri Lanka	17	153
Sudan	50	406
Yemen	10	45
Zaire	14	50
Zambia	10	34
Subtotal A	$535	3,596

Countries over $790 Per Capita GNP	TOTAL[1] ($Millions)	WHEAT/ FLOUR[2]
Costa Rica	$ 16	129
Dominican Republic	30	119
Guatemala	19	118
Jamaica	38	150
Peru	20	117
Tunesia	15	136
Subtotal B	$138	769
Subtotal A	$535	3,596
Total Allocated	$673	4,365

[1]Allocated for all commodities.
[2]1,000 tons grain equivalent.

U.S. WHEAT/FLOUR TRADE WITH SELECTED COUNTRIES UNDER GSM-102 EXPORT CREDIT GUARANTEE PROGRAM[1]

	FY 1986		FY 1987		
	Guarantees Approved $ Millions	Estimated Quantity Shipped 1,000 Tons	Programs Announced $ Millions	Programs Approved $ Millions	Estimated Quantity Purchased[2] 1,000 Tons
Algeria	$44.4	317.1	$ 197.0	$101.7	924.5
Brazil	65.9	470.7	150.0	3.8	34.5
Chile	18.9	135.0[3]	25.0	—	—
Colombia	24.6	175.7	23.0	2.6	23.6
Ecuador	50.4	360.0	18.0	16.4	149.1
Egypt	140.7	900.7[3]	122.0[3]	69.9	635.5
Haiti	5.0	35.7	1.5	1.3	11.8
Iraq	122.2	754.5[3]	110.0[3]	88.6	748.0
Jamaica	1.1	7.9[3]	—	—	—
Jordan	12.4	88.6	—	—	—
Korea	159.1	1,136.4	165.0	131.4	1,194.5
Mexico	—	—	15.0	1.6	—
Morocco	101.2	722.9	32.6	32.6	296.4
Portugal	33.7	240.7	32.9	3.7	33.6
Senegal	—	—	8.5	2.6	23.6
Tunisia	34.9	249.3	50.0	11.7	106.4
Turkey	59.2	422.9	50.0	18.4	167.3
Yemen	9.9	70.7[3]	16.0[3]	16.0	116.3
Zanzibar	—	—	1.0	0.7	4.1
TOTAL	$883.6	6,088.8	$1,017.5	$503.0	4,469.2

[1]As of July 1987.
[2]Based on $110 per ton for wheat and $190 per ton for wheat flour.
[3]Wheat and wheat flour.

Sponsored by CIBA-GEIGY

WHEAT SUPPLY AND DISAPPEARANCE: MAJOR U.S. COMPETITORS

1980/81–1987/88
(million metric tons/hectares)

	Area Harvested	Yield	Production	Domestic Use	Exports[1] July/June	Exports[1] Mkt. Year	Percentage of World Trade	Exports as Percentage of Production	Mkt. Year Ending Stocks[2]
CANADA (Marketing Year August/July)									
1980/81	11.1	1.74	19.3	5.2	17.0	16.3	18.1	88.1	8.6
1981/82	12.4	2.00	24.8	5.2	17.6	18.4	17.4	71.0	9.8
1982/83	12.6	2.13	26.7	5.1	21.4	21.4	21.7	80.2	10.0
1983/84	13.7	1.94	26.5	5.6	21.8	21.8	21.4	82.3	9.2
1984/85	13.2	1.61	21.2	5.2	19.4	17.6	18.1	91.5	7.6
1985/86	13.7	1.77	24.3	5.6	16.8	17.7	19.9	69.1	8.6
1986/87[3]	14.2	2.24	31.9	6.1	21.0	21.0	23.3	65.8	13.3
1987/88[4]	13.5	1.94	26.2	5.9	22.0	22.0	22.5	84.0	11.6
AUSTRALIA (Marketing Year October/September)									
1980/81	11.3	0.96	10.9	3.5	10.6	9.6	11.3	97.3	2.0
1981/82	11.9	1.38	16.4	2.6	11.0	11.0	10.9	67.1	4.8
1982/83	11.5	0.77	8.9	4.1	8.1	7.3	8.2	91.0	2.3
1983/84	12.9	1.70	22.0	3.4	10.6	13.3	10.4	48.2	7.5
1984/85	12.1	1.55	18.7	2.9	15.8	14.7	14.8	84.5	8.6
1985/86	11.7	1.38	16.1	2.8	16.0	16.0	18.9	99.4	5.9
1986/87[3]	11.3	1.48	16.7	3.1	15.0	15.0	16.6	89.8	4.6
1987/88[4]	10.0	1.40	14.0	3.0	13.0	13.0	13.3	92.9	2.6
ARGENTINA (Marketing Year December/November)									
1980/81	5.0	1.55	7.8	4.0	3.9	3.8	4.1	50.0	0.4
1981/82	5.9	1.40	8.3	4.3	4.3	3.6	4.2	51.8	0.8
1982/83	7.3	2.05	15.0	4.8	7.5	9.9	7.6	50.0	1.1
1983/84	6.9	1.85	12.8	4.7	9.7	7.8	9.5	75.8	1.3
1984/85	6.0	2.22	13.2	4.6	8.0	9.4	7.5	60.6	0.5
1985/86	5.3	1.61	8.5	4.4	6.1	4.3	7.2	71.8	0.3
1986/87[3]	5.1	1.76	9.0	4.5	4.5	4.5	5.0	50.0	0.3
1987/88[4]	5.0	1.90	9.5	4.5	5.0	5.1	5.1	52.6	0.2
EUROPEAN COMMUNITY (Marketing Year July/June)									
1980/81	15.6	3.94	61.5	49.4	15.7[5]	21.7	16.7	25.5	11.6
1981/82	15.7	3.71	58.1	49.6	15.7[5]	22.3	15.5	27.0	9.8
1982/83	16.0	4.04	64.7	50.2	16.3[5]	21.9	16.5	25.2	12.4
1983/84	16.1	3.97	63.8	56.0	15.5[5]	22.3	15.2	24.3	8.8
1984/85	16.2	5.13	82.9	59.9	18.5[5]	28.4	17.3	22.3	16.4
1985/86	15.3	4.69	71.6	59.4	15.6[5]	27.8	18.4	21.8	16.1
1986/87[3]	15.7	4.57	71.7	60.9	15.0[5]	28.3	16.6	20.9	13.3
1987/88[4]	15.9	4.96	79.0	61.4	17.0[5]	27.6	17.4	21.5	16.1

[1]Includes the wheat equivalent of flour.
[2]Net change in farm stocks for Argentina and Australia are reflected in domestic disappearance.
[3]Preliminary.
[4]Projected.
[5]Excludes Intra-EC trade.

WHEAT: WEIGHTS, MEASURES AND CONVERSION FACTORS

Bushel Weights:

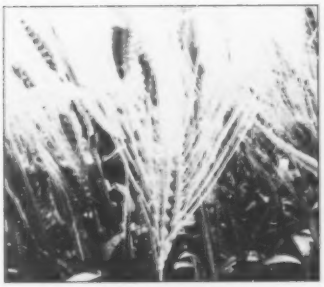
1 bu. wheat/soybeans	= 60 lbs.
1 bu. corn/sorghum	= 56 lbs.
1 bu. barley	= 48 lbs.
1 bu. oats	= 32 lbs.

1 Bushel of Wheat Equals:

0.030	short tons
0.0272155	metric tons
0.0267857	long tons
27.21555	kilograms

Bushels to Metric Tons:

Wheat/soybeans	= bu.	×	0.027216
Corn/sorghum	= bu.	×	0.025400
Barley	= bu.	×	0.021772
Oats	= bu.	×	0.014515



Wheat Flour Equivalents

1 metric ton wheat flour	= 1.38 metric ton wheat
100 pounds	= 2.3 bushels
43.5 pounds	= 1 bushel
1 barrel wheat flour	= 196 pounds
4.51 bushels	= 1 barrel of flour

1 Metric Ton Equals

2,204.622	pounds
1,000	kilograms
36.74371	bu. of wheat or soybeans
39.3679	bu. of corn or sorghum
45.9296	bu. of barley
68.8944	bu. of oats
22.046	hundredweight
10	quintals

Acreage Equivalents

1 hectare	= 2.4710 acres
1 sq. mile	= 640 acres (259 hectares)
1 acre	= 0.404694 hectares = 4,840 sq. yards = .9 football fields, excluding end zones.

Test Weight

pounds/bushel × 1.2872 = kilograms/hectalitre

Yield Equivalents

Wheat:	bu./acre x 0.6725	= metric tons/hectare
Corn:	bu./acre x .06277	= metric tons/hectare
Barley:	bu/acre x .05380	= metric tons/hectare
Oats:	bu./acre x .03587	= metric tons/hectare

Sponsored by CIBA-GEIGY

WHEAT FACTS

Kernels of wheat contained in one bushel: 1 million

Wheat varieties grown in the United States: over 400

Gallons of water used to irrigate U.S. wheat in 1984: 1.82 trillion

Olympic-size swimming pools that 1.82 trillion gallons of water will fill: 3,033,333

Percent of 1987 U.S. wheat crop produced in the 18 NAWG states: 85.0

Percent of 1987 U.S. wheat crop produced in Kansas and North Dakota combined: 30.6

Combines sold in the U.S., January through June 1984: 3,403

January through June 1987: 997

Bushels of wheat a modern combine can harvest each hour: 1,000

One-pound loaves of white bread that can be made from one bushel of wheat: 73

1986 per capita U.S. consumption of wheat flour: 126 pounds

1985 per capita Algerian consumption of wheat flour: 380 pounds

Bushels of wheat used every day in the United States: 2.95 million

In the world: 52.2 million

Number of people employed in some phase of U.S. agriculture: 21 million

Rank of agriculture as a U.S. employer: 1

Rank of agriculture as a U.S. industry: 1

Total assets of U.S. farms: over $956 billion

Total U.S. farm debt: $188 billion

Amount owed to foreign creditors by Brazil and Mexico: $204 billion

Amount owed to foreign creditors by the United States: $210 billion

1986 U.S. net farm income: $27 billion

Amount consumers paid for food packaging, 1986: $28 billion

1986 farm foreclosures by Farmers Home Administration: 111

By the Farm Credit System: 5,454

Houston, Texas, home foreclosures, January through July 1987: 19,030

1985 U.S. small business failures: 57,067

Per-bushel cost (Sept. 1987) to ship wheat from U.S. Gulf to Morocco on U.S.-flag vessels: $1.08

On foreign-flag vessels: 20.7 cents

Number of people supplied with food and fiber by one farmer, 1972: 50

Today: 76

Percent of disposable income Americans spend on food: 16.1

Man-hours required to produce one bushel of wheat, 1880: 3.73

Today: 0.07

Surface area of the United States: 2.3 billion acres

Acres of U.S. land devoted to agriculture, including forestry: 1.3 billion

Percent of U.S. "agricultural land" owned by foreigners: 0.95

Percent of U.S. cropland owned by foreigners: 0.16

Taxes paid on farm property, 1940: $451 million

In 1985: $4.4 billion

Interest paid on farm mortgages, 1940: $293 million

In 1985: $9.9 billion

Total farm production expenses, 1940: $6.9 billion

In 1985: $135.1 billion

Amount of 1978-crop wheat in farmer-owned reserve: 560,000 bushels